

We Claim:

1. An electrically programmable memory element, comprising:

a programmable resistance material;

a threshold switching material; and

5 a first layer of a dielectric material between said programmable resistance material and said threshold switching material.

2. The memory element of claim 1, further comprising a second  
10 layer of a dielectric material, said threshold switching material being between said first layer of said dielectric material and said second layer of said dielectric material.

3. The memory element of claim 2, further comprising a third layer  
15 of a dielectric material, said programmable resistance material being between said third layer of said dielectric material and said first layer of said dielectric material.

4. The memory element of claim 1, further comprising a second  
20 layer of a dielectric material, said programmable resistance material being between said first layer of said dielectric material and said second layer of said dielectric material.

5. The memory element of claim 1, wherein said programmable resistance material is a phase-change material.

6. The memory element of claim 1, wherein said programmable resistance material comprises a chalcogen element.

7. The memory element of claim 1, wherein said threshold switching material comprises a chalcogen element.

8. The memory element of claim 1, wherein said first layer of said dielectric material has a thickness of less than 100 Angstroms.

9. The memory element of claim 1, wherein said dielectric material comprises a material selected from the group consisting of oxide and nitride.

10. The memory element of claim 1, wherein said dielectric material is silicon nitride.

11. An electrically programmable resistance memory element, comprising:

a programmable resistance material;

a dielectric material formed over said programmable

resistance material; and

a threshold switching material formed over said dielectric material.

5 12. The memory element of claim 11, wherein programmable resistance material comprises a chalcogen element.

13. The memory element of claim 11, wherein said threshold switching material comprises a chalcogen element.

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14. The memory element of claim 11, wherein said dielectric material comprises an oxide or a nitride.

15 15. The memory element of claim 11, wherein said threshold switching material has an S-type current-voltage characteristic.

16. An electrically programmable resistance memory element, comprising:

a threshold switching material;

20 a dielectric material formed over said threshold switching material; and

a programmable resistance material formed over said dielectric material.

17. The memory element of claim 16, wherein programmable resistance material comprises a chalcogen element.

18. The memory element of claim 16, wherein said threshold  
5 switching material comprises a chalcogen element.

19. The memory element of claim 16, wherein said dielectric material comprises an oxide or a nitride.

10 20. The memory element of claim 16, wherein said threshold switching material has an S-type current-voltage characteristic.